

Fig. 1

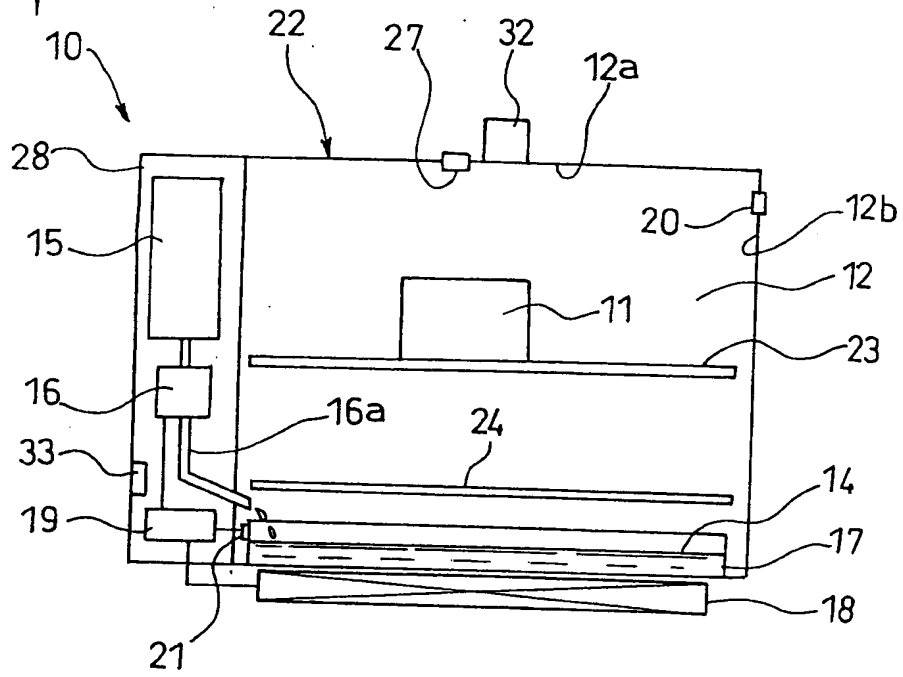


Fig. 2

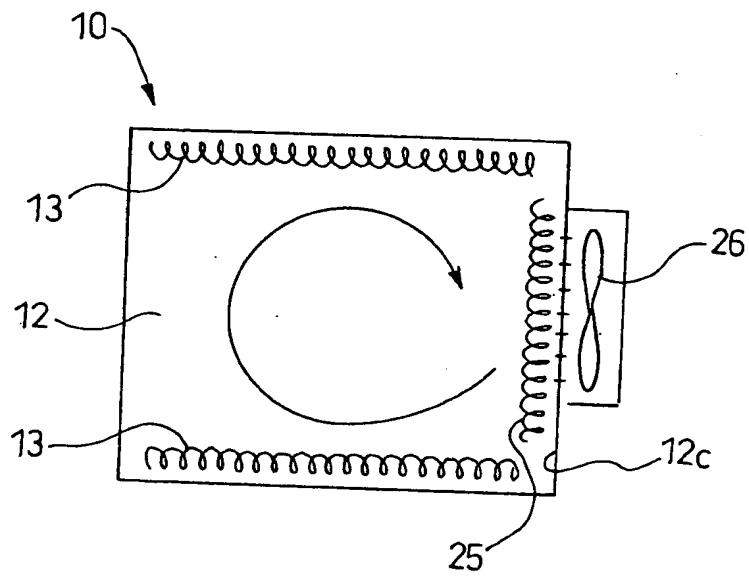


Fig 3

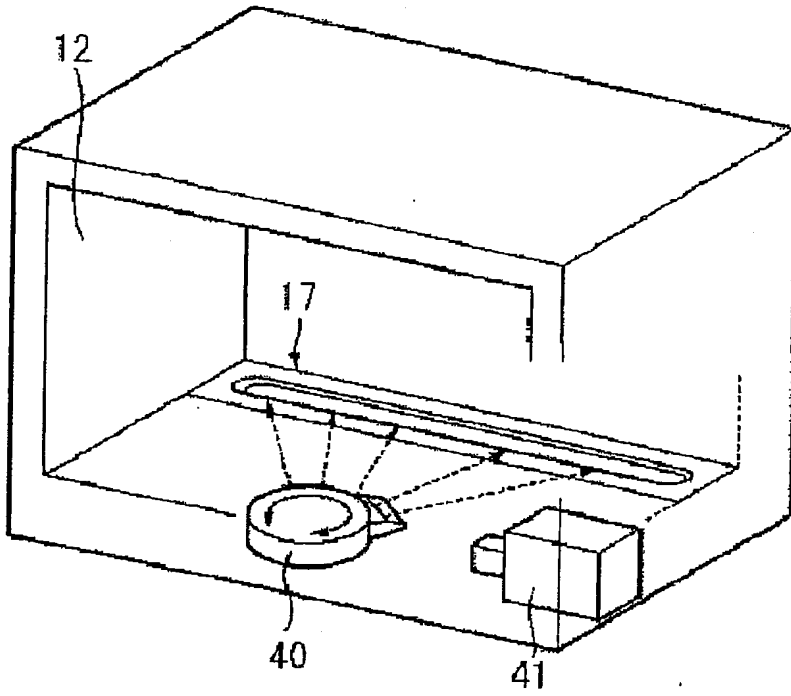
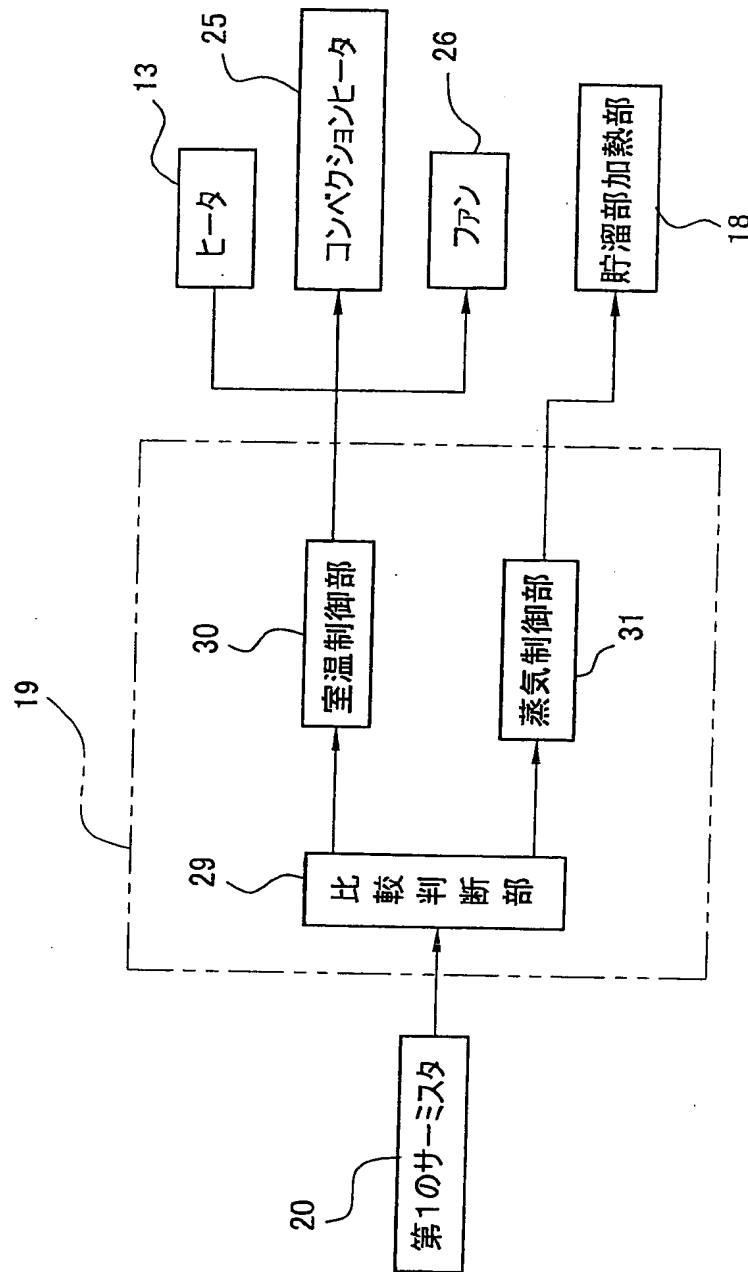


Fig. 4



[Fig. 4]

- 20: First thermistor
- 29: Compare and judge portion
- 30: Heating chamber temperature control portion
- 31: Steam supply portion
- 13: Heater
- 25: Convection heater
- 26: Fan
- 18: Storage part heating part

Fig 5(A)

① ●庫内温度が低い場合

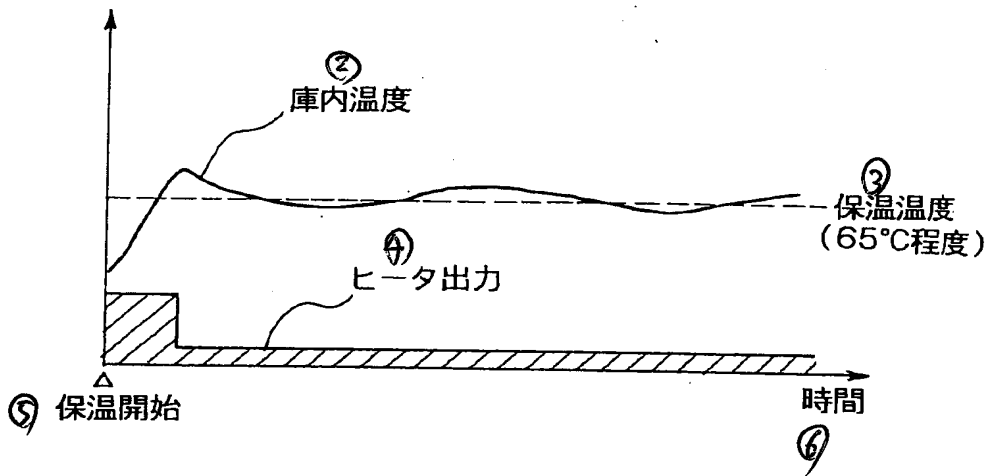
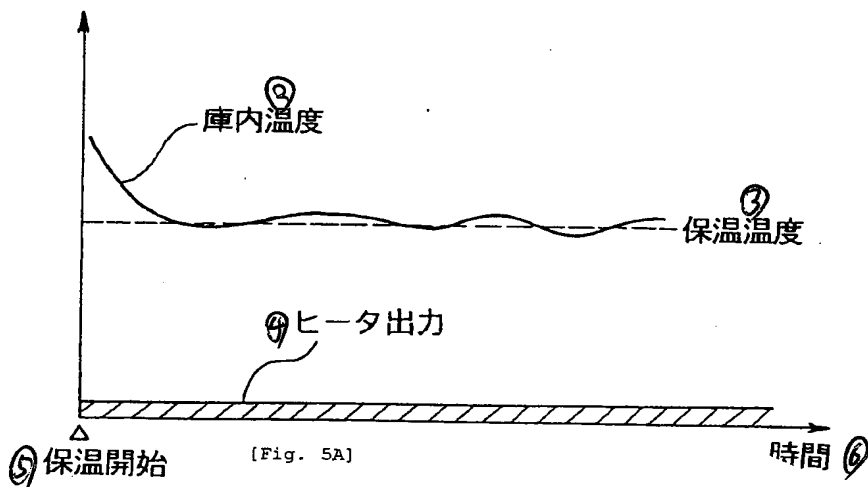


Fig 5 (B)

●庫内温度がもともと高い場合
① (オープン調理終了後など)



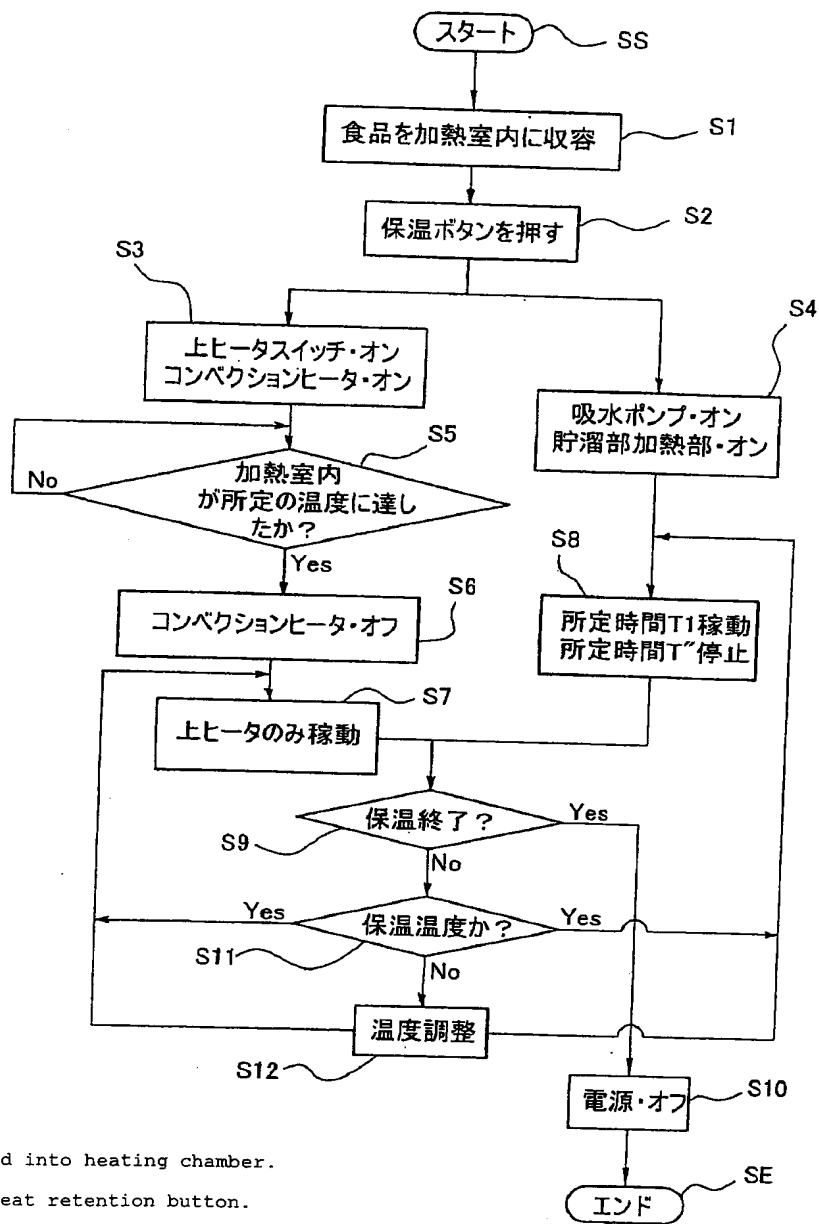
[Fig. 5A]

- ① When heating chamber interior temperature is low
- ② Heating chamber interior temperature
- ③ Heat retaining temperature (about 65°C)
- ④ Heater output
- ⑤ Start of heat retention
- ⑥ Time

[Fig. 5B]

- ① When heating chamber interior temperature is originally high
(For example, after end of oven cooking)
- ② Heating chamber interior temperature
- ③ Heat retaining temperature
- ④ Heater output
- ⑤ Start of heat retention
- ⑥ Time

Fig 6



[Fig. 6]

SS: Start

S1: Store food into heating chamber.

S2: Depress heat retention button.

S3: Turn on upper heater switch and convection heater.

S4: Turn on water pump and storage part heating part.

S5: If heating chamber interior temperature has reached given temperature?

S6: Turn off convection heater.

S7: Operate only upper heater.

S8: Operate water pump and storage part heating part for given time T1 and stop them for given time T'.

S9: If heat retention is ended?

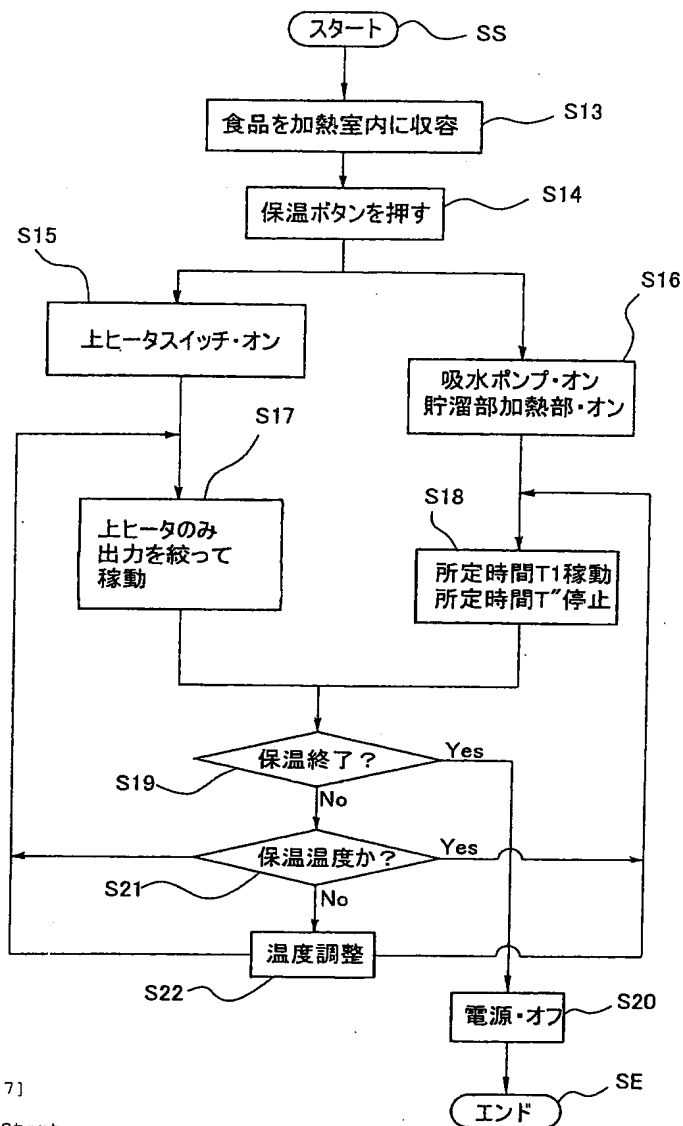
S11: If heating chamber interior temperature is given heat retaining temperature?

S12: Adjust temperature.

S10: Turn off power supply.

SE: End

[図7]



[Fig. 7]

SS: Start

S13: Store food into heating chamber.

S14: Depress heat retention button.

S15: Turn on upper heater switch.

S16: Turn on water pump and storage part heating part.

S17: Operate only upper heater while turning down output.

S18: Operate water pump and storage part heating part for given time T1 and stop them for given time T''.

S19: If heat retention is ended?

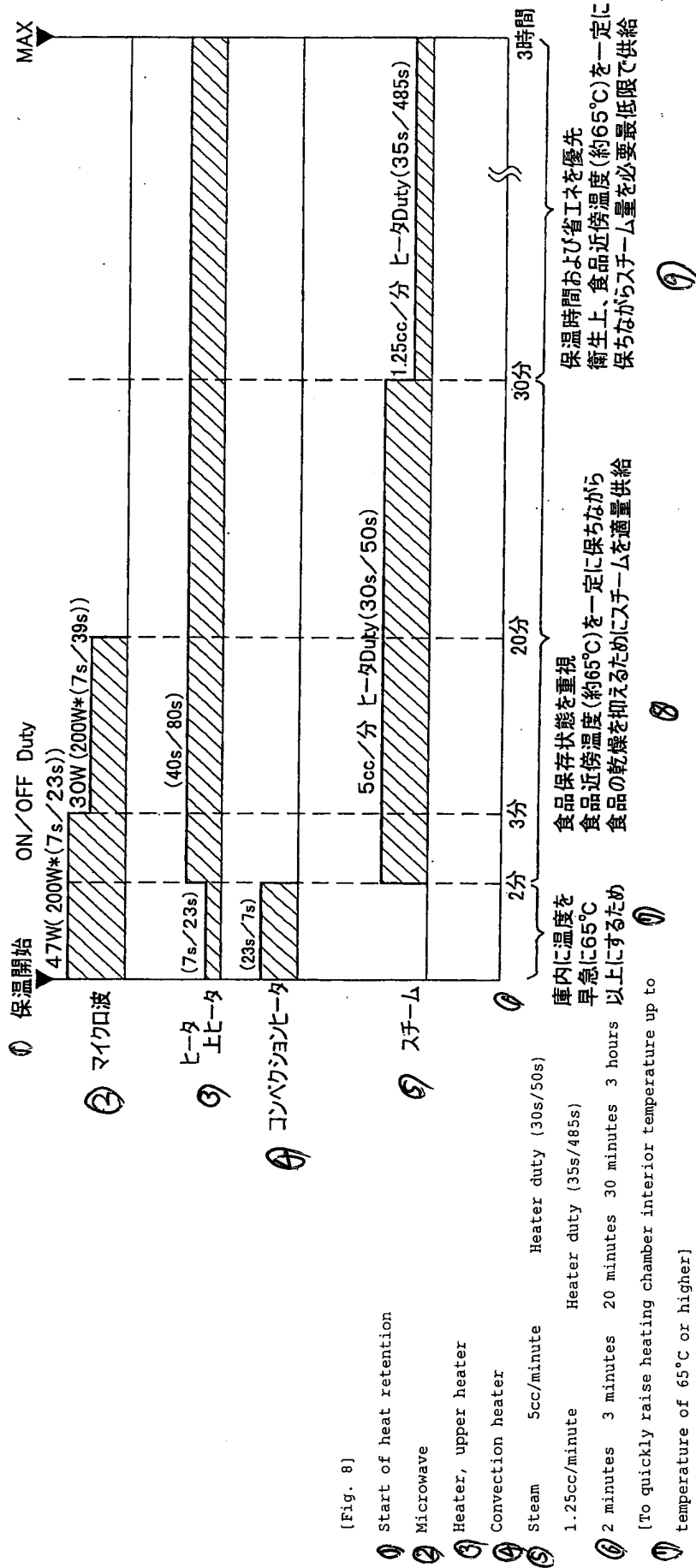
S21: If heating chamber interior temperature is heat retaining temperature?

S22: Adjust temperature.

S20: Turn off power supply.

SE: End.

Fig. 8



[Fig. 8]

① Start of heat retention

② Microwave

③ Heater, upper heater

④ Convection heater

⑤ Steam 5cc/minute Heater duty (30s/50s)

⑥ 1.25cc/minute Heater duty (35s/485s)

⑦ 2 minutes 3 minutes 20 minutes 30 minutes 3 hours

⑧ [To quickly raise heating chamber interior temperature up to temperature of 65°C or higher]

⑨ [Priority is given to food reserving state.]

⑩ [While maintaining food vicinity temperature (about 65°) constant, proper amount of steam is supplied to prevent food from drying.]

⑪ [Priority is given to heat retention time and energy saving.]

⑫ [For hygiene purpose, while maintaining food vicinity temperature (about 65°C) constant, necessary minimum amount of steam is supplied.]

Fig 9

	食品近傍温度 (増殖抑制効果)	食品状態 (ダメージ)	ラップの必要性	
			(21) ラップあり	(22) ラップなし
① マイクロ波	▲ 食料分量により 食品温度が大きく変動	▲ 食料分量および時間 により乾燥状態発生	○ ラップは必須	× 乾燥
② ヒータ	○ 庫内温度上昇は早い、 食品近傍温度?	× 食品温度上昇優先 すれば乾燥状態発生	△ 温度によっては ラップが使えない	× 乾燥
③ スチーム	▲ 立ち上がり 時間がかる	▲ 乾燥しないが食品 によってはべたになる	○	○
④ マイクロ波 + スチーム	▲ 食料分量により 食品温度が大きく変動	○ 食料分量および時間 による乾燥状態を スチームで緩和できる	△ 長時間の場合、 ラップ必要	○ ~ ▲ 時間、スチーム量 により乾燥あり
⑤ ヒータ + スチーム	○ 庫内温度上昇は早い、 食品近傍温度?	▲ 食料分量および時間 により乾燥状態発生	△ 長時間の場合、 ラップ必要	○ 時間、スチーム量 により乾燥あり
⑥ マイクロ波 + ヒータ + スチーム	◎ ヒータで庫内温度 上昇を早く、 マイクロ波で 食品温度を上昇	○ 食料分量および時間 による乾燥状態を スチームで緩和できる	△ 長時間の場合、 ラップ必要	○ 時間、スチーム量 により乾燥あり

- ③ Microwave ② Heater ③ Steam
- ④ Microwave + Steam ⑤ Heater + Steam
- ⑥ Microwave + Heater + Steam
- ⑦ Food vicinity temperature (multiplication preventive effect)
- ⑧ [Food temperature varies greatly depending on food quantity.]
- ⑨ [Heating chamber interior temperature rises quickly but food vicinity temperature does not rise so quickly.]
- ⑩ [It takes time to raise heating chamber interior temperature.]
- ⑪ [Food temperature varies greatly depending on food quantity.]
- ⑫ [Heating chamber interior temperature rises quickly but food vicinity temperature does not rise so quickly.]
- ⑬ [Heating chamber interior temperature can be raised quickly by heater and food temperature can be raised by microwaves.]
- ⑭ [State of food] (Damage)
- ⑮ [Food dries depending on food quantity and time.]
- ⑯ [When priority is given to the rise of food temperature, food dries.]
- ⑰ [Food does not dry, but some food gets watery.]
- ⑱ [Food drying due to food quantity and time can be reduced by steam.]
- ⑲ [Food dries depending on food quantity and time.]
- ⑳ [Food drying due to food quantity and time can be reduced by steam.]
- ㉑ [Need of wrapping]

- ㉒ [With wrapping]
- ㉓ Wrapping is indispensable.
- ㉔ Wrapping cannot be used depending on temperature.
- ㉕ Wrapping is necessary for long heat retention.
- ㉖ Wrapping is necessary for long heat retention.
- ㉗ Wrapping is necessary for long heat retention.

- ㉘ [Without wrapping]
- ㉙ Food dries.
- ㉚ Food dries.
- ㉛ Food dries depending on time and steam amount.
- ㉜ Food dries depending on time and steam amount.
- ㉝ Food dries depending on time and steam amount.

Fig. 10

① 食品の菌増殖温度と加熱温度における死滅時間

② 食品の菌	⑦ 最適増殖温度	⑪ 増殖時間	⑮ 加熱温度	⑲ 死滅時間
③ 通常の菌	⑧ 約30~40℃	⑫ 約30分	—	—
④ 増殖の速い菌	⑨ 腸炎ビブリオ 約38℃	⑬ 約7~8分	⑭ 約60℃	⑯ 約30℃
⑤ 大腸菌	⑩ 約20~40℃	⑭ 約15分	⑮ 約60℃	⑯ 約30℃

⑲ 増殖時間=対数期(細胞数約10² /g → 約10⁸ /g に要する時間)

[Fig. 10]

① Food bacteria multiplication temperature and extinction time in heating temperature

② [Bacteria of food]

③ Normal bacteria

④ Quick multiplication bacteria (Enteritis vibrio) (Colon bacillus)

⑤ [Optimum multiplication temperature]

⑥ about 30 ~ 40℃ ⑦ about 38℃ ⑧ about 20 ~ 40℃

⑨ [Multiplication time]

⑩ about 30 minutes

⑪ about 7 ~ 8 minutes

⑫ about 15 minutes

⑬ [Heating temperature]

⑭ about 60°

⑮ [Extinction time]

⑯ about 30℃

⑰ Multiplication time = logarithmic number period (time necessary for the number of cells about 10²/g → about 10⁸/g)

Fig. 11

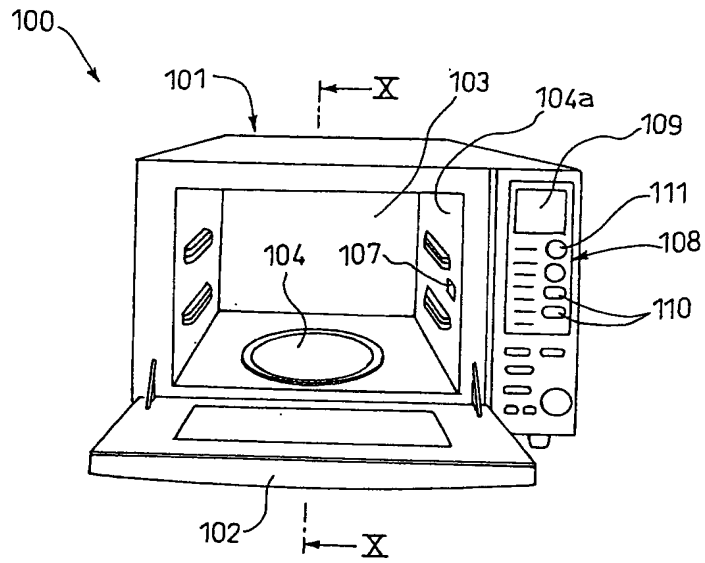


Fig. 12

